

What is claimed is:

1. An isolated and purified mammalian fatty-acid amide hydrolase (FAAH) Isolated fatty-acid amide that hydrolyzes cis-9, 10-octadecenoamide, anandamide, myristic amide, palmitic amide and stearic amide.
2. The FAAH of claim 1 wherein said FAAH has an amino acid residue sequence shown in SEQ ID NO 36.
3. The FAAH of claim 1 wherein said FAAH has an amino acid residue sequence shown in SEQ ID NO 40.
4. The FAAH of claim 1 wherein said FAAH has an amino acid residue sequence shown in SEQ ID NO 43.
5. The FAAH of claim 1 wherein said FAAH comprises an amino acid sequence selected from the group consisting of:
 - a..) GGSSGGEGALIGSGGSPLGLGTDIGGSIRFP (SEQ ID NO 5),
 - b.) SPGGSSGGEGALIGS (SEQ ID NO 6),
 - c.) ALIGSGGSPLGLGTD (SEQ ID NO 7),
 - d..) GLGTDIGGSIRFP (SEQ ID NO 8),
 - e.) RFPSAFCGICGLKPT (SEQ ID NO 9),
 - f.) GLKPTGNRLSKSGLK (SEQ ID NO 10),
 - g.) KSGLKGCVYGQTAVQ (SEQ ID NO 11),
 - h.) QTAVQLSLGPMARDV (SEQ ID NO 12),
 - i.) MARDVESLALCLKAL (SEQ ID No 13),
 - j.) CLKALLCEHLFTLDP (SEQ ID NO 14),
 - k.) FTLDPTVPPFPFREE (SEQ ID NO 15),
 - l.) PFREEVYRSSRPLRV (SEQ ID NO 16),
 - m.) RPLRVGYSETDNYTM (SEQ ID NO 17),
 - n.) DNYTMPSPAMRRALI (SEQ ID NO 18),
 - o.) RRALIETKQRLAAG (SEQ ID NO 19),

- p.) LEAAGHTLIPFLPNN (SEQ ID NO 20),
- q.) FLPNNIPYALEVLSA (SEQ ID NO 21),
- r.) EVLSAGGLFSDGGRS (SEQ ID NO 22),
- s.) DGGRSFLQNFKGDFV (SEQ ID NO 23),
- t.) KGDFVDPCLGDLILI (SEQ ID NO 24),
- u.) DLILILRLPSWFKRL (SEQ ID NO 25),
- v.) WFKRLLSLLLKPLFP (SEQ ID NO 26),
- w.) KPLFPRLAAFLNSMR (SEQ ID NO 27),
- x.) LNSMRPRSAEKLWKL (SEQ ID NO 28),
- y.) KLWKLQHEIEMYRQS (SEQ ID NO 29),
- z.) MYRQSVIAQWKAMNL (SEQ ID NO 30),
- aa.) KAMNLDVLLTPMLGP (Seq ID NO 31), and
- ab.) PMLGPALDLNTPGR (SEQ ID NO 32).

6. The FAAH of claim 1 wherein said FAAH is isolated from a mammal.

7. The FAAH of claim 1 wherein said FAAH is produced by expression of a recombinant DNA expression vector that includes the nucleotide sequence that encodes FAAH having a sequence selected from the group consisting of SEQ ID Nos 35, 39 and 42.

8. The FAAH of claim 1 wherein said FAAH is isolated by purification by a chromatographic methodology selected from a group consisting of affinity chromatography, electric chromatography, gel filtration chromatography, ion exchange chromatography, and partition chromatography.

9. The FAAH of claim 8 wherein said affinity chromatography employs a solid phase absorbant derivatized with a trifluoroketone inhibitor of FAAH for adsorbing the FAAH.

10. The FAAH of claim 1 wherein said FAAH is isolated by

purification as follows:

Step A: a crude source of FAAH is purified by exchange chromatography using a DEAE chromatography column to form a first elution product; then

Step B: the first elution product of said Step A is further purified by elution on an Hg affinity chromatography column to form a second elution product; then

Step C: the second elution product of said Step B is further purified by elution on a Heparin affinity chromatography column to form a third elution product; and then

Step D: the elution product of said Step C is further purified by elution on an affinity chromatography column derivatized with a trifluoroketone inhibitor of FAAH to form the purified form of FAAH.

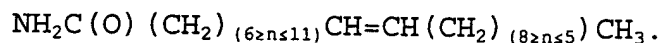
11. A method for catalyzing a hydrolysis of a fatty-acid primary amide comprising the step of contacting the fatty-acid primary amide under reaction conditions with a catalytic amount of an isolated FAAH described in claim 1.

12. The method for catalyzing a hydrolysis of a fatty-acid primary amide according to claim 11 wherein the fatty-acid primary amide includes an alkyl chain having an unsaturation.

13. The method for catalyzing a hydrolysis of a fatty-acid primary amide according to claim 12 wherein the unsaturation is in an alkyl chain having a *cis* configuration.

14. The method for catalyzing a hydrolysis of a fatty-acid primary amide according to claim 11 wherein the fatty-acid primary amide is selected from the group consisting of *cis*-9,10-

octadecenoamide, *cis*-8,9-octadecenoamide, *cis*-11,12-octadecenoamide, *cis*-13,14- docosenoamide, and a fatty-acid primary amide having the formula:

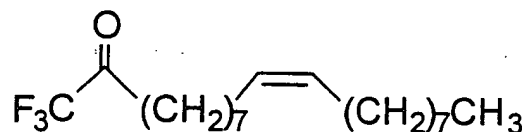


15. A method for inhibiting an enzymatically catalyzed hydrolysis of a fatty-acid primary amide by the FAAH of claim 1, the method comprising the step of contacting said FAAH with an inhibitor of the FAAH.

16. The method of claim 15 wherein said fatty-acid primary amide substrate is selected from the group consisting of *cis*-9,10-octadecenoamide, anandamide, myristic amide, palmitic amide and stearic amide.

17. The method according to claim 15 wherein said fatty-acid primary amide is *cis*-9,10-octadecenoamide.

18. The method of claim 15 wherein said inhibitor of FAAH is selected from the group consisting of phenylmethylsulfonyl fluoride, HgCl_2 , and a trifluoroketone having the following structure:



19. A method for ascertaining the inhibitory activity of a candidate inhibitor of fatty-acid amide hydrolase (FAAH), the method comprising the following steps:

Step A: forming mixture "A" by combining FAAH according to claim 1 and a fatty-acid primary amide substrate under reaction conditions;

Step B: forming mixture "B" by combining the mixture "A" of said Step A with the candidate inhibitor; then

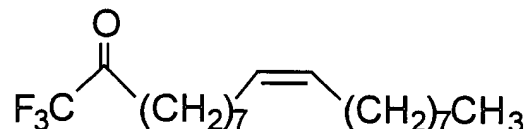
Step C: quantifying the conversion of said fatty-acid primary amide substrate to a hydrolysis product within mixture "A";

Step D: quantifying the conversion of said fatty-acid primary amide substrate to hydrolysis product within mixture "B"; and then

Step E: ascertaining the inhibitory activity of the candidate inhibitor by comparing the quantifications of said Steps C and D.

20. The method of claim 19 wherein said fatty-acid primary amide substrate is selected from the group consisting of *cis*-9,10-octadecenoamide, anandamide, myristic amide, palmitic amide and stearic amide.

21. A trifluoroketone inhibitor of fatty-acid amide hydrolase represented by following structure:



22. A nucleic acid molecule encoding a fatty-acid amide hydrolase protein, said nucleic acid molecule having a nucleotide sequence selected from the group consisting of SEQ ID NO 35, SEQ ID NO 39 and SEQ ID NO 42.

23. A nucleic acid molecule encoding a portion of a fatty-acid amide hydrolase protein, said nucleic acid molecule having the nucleotide sequence shown in SEQ ID NO 1:1-783.

24. The mammalian fatty-acid amide hydrolase of claim 1 that is a human fatty-acid amide hydrolase.